

## CLAIMS

WE CLAIM:

1. A brush chipper comprising:

a frame;

cutting members for cutting tree branches operatively attached to said frame;

at least one rotary member operably mounted to said frame for rotating in one direction to pull said tree branches and deliver said branches to said cutting members thereby cutting the branches into smaller pieces;

a feed table operably attached to said frame for supporting said branches and guiding said branches toward said rotary member, said feed table having a front end and a rear end, said front end being adjacent to said rotary member;

a lower feed stop member operatively attached to the front end of said feed table, said lower feed stop member having a forward position, an intermediate position and a rearward position; and

a shut off mechanism operatively attached to said feed table and to said lower feed stop member for shutting off the rotation of the rotary member when said lower feed stop member moves from said rearward position to a predetermined one of said forward position or said intermediate position, whereby when said lower feed stop member moves to said predetermined position, the shut off mechanism will stop the rotary member.

2. The brush chipper of claim 1 wherein said predetermined position of said lower feed stop member is adjustable to shut off said rotary member when said lower feed stop member is in said forward position or said intermediate position.

3. The brush chipper of claim 1 wherein said predetermined position of said lower feed stop member is adjustable to a position between said forward and rearward position.

4. The brush chipper of claims 2 wherein said feed table is pivotally attached to said frame for selective movement between a transport position and an operative position and including means for automatically resetting said predetermined position of said lower feed stop member to said intermediate position thereof whenever said feed chute is pivoted to said transport position.

5. The brush chipper of claims 2 including means for automatically resetting said predetermined setting of said lower feed stop member to said intermediate position whenever the brush chipper is shut off and then turned back on.

6. The brush chipper of claim 1 including a latching means for selectively holding said feed table in said transport position thereof, said latching means having a latching position and an unlatching position.

7. The brush chipper of claim 6 including means for automatically resetting said predetermined position of said lower feed stop member to said intermediate position whenever said latching means is moved to said unlatching position.

8. The brush chipper of claim 2 wherein said predetermined position is set to default to normal sensitivity which corresponds to the intermediate position of the lower feed stop member and a switch is operably attached thereto for permitting the predetermined position to be changed to a reduced sensitivity corresponding to the forward position thereof.

9. The brush chipper of claim 1 including an upper feed control member for also controlling the rotary feed member, said upper feed control bar having a stop position for stopping the rotary feed member, a forward position for causing forward feed of the rotary feed member by rotation in one direction, a neutral position and a reverse position for causing the rotary feed member to rotate in a direction reverse of said one direction.

10. The brush chipper of claim 1 wherein said intermediate position is normal sensitivity and the rearward position is reduced sensitivity and an indicator is provided for indicating when operating at reduced sensitivity.

11. The brush chipper of claim 10 wherein said indicator is a light.

12. A method of operating a brush chipper of a type comprising:

- a frame;
- cutting members for cutting tree branches operatively attached to said frame;
- at least one rotary member operably mounted to said frame for rotating in one direction to pull said tree branches and deliver said branches to said cutting members thereby cutting the branches into smaller pieces;
- a feed table operably attached to said frame for supporting said branches and guiding said branches toward said rotary member, said feed table having a front end and a rear end, said front end being adjacent to said rotary member;
- a lower feed stop member operatively attached to the front end of said feed table, said lower feed stop member having a forward position, an intermediate position and a rearward position;
- a shut off mechanism operatively attached to said feed table and to said lower feed stop member for shutting off the rotation of the rotary member when said lower feed stop member moves from said rearward position to a predetermined one of said forward position or said intermediate position, whereby when said lower feed stop member moves to said predetermined position, the shut off mechanism will stop the rotary member; and
- wherein said predetermined position of said lower feed stop member is adjustable to shut off said rotary member when said lower feed stop member is in said forward position for reduced sensitivity or said intermediate position for normal sensitivity, said method comprising:
  - operating said brush chipper at normal sensitivity; and
  - if the lower feed stop bar is actuated too often during normal feeding operation, selecting a reduced sensitivity mode; and

operating said brush chipper at said reduced sensitivity of the lower feed stop member.

13. A brush chipper comprising:

a frame;

cutting members for cutting tree branches operatively attached to said frame;

at least one rotary feed member operably mounted to said frame for rotating in one direction to pull said tree branches and deliver said branches to said cutting members for cutting the branches into smaller pieces;

a feed table operably attached to said frame for supporting said branches and guiding said branches toward said rotary member, said feed table having a front end and a rear end, said front end being adjacent to said rotary feed member; and

an upper feed control member for controlling the rotary feed member, said upper feed control bar having a stop position for stopping the rotary feed member, a forward feed position for causing forward feed of the rotary feed member by rotation in one direction, a neutral position and a reverse position for causing the rotary feed member to rotate in a direction reverse of said one direction.

14. The brush chipper of claim 13 including wherein once said rotary feed member stops, means is provided for preventing said rotary feed member from rotating to cause forward feed until said upper feed control member is moved to said reverse position thereof and then moved back to said forward position thereof.

15. The brush chipper of claim 13 wherein a lower feed stop member is operatively attached to the front end of said feed table, said lower feed stop member having a forward position, an intermediate position and a rearward position.

16. The brush chipper of claim 13 including:

a forward feed switch operatively attached to said frame and to a circuit for causing the rotary feed member to rotate in a forward feed direction under certain circumstances when the forward feed switch is activated;

a stop switch operatively attached to said frame and to a circuit for shutting off the rotary feed member when said stop switch is activated and permitting said rotary feed member to rotate under other circumstances when said stop switch is not activated;

a reverse switch operatively attached to said frame and to a circuit for reversing the direction of the rotary feed member under certain circumstances when the reverse switch is activated; and

means for permitting an operator to activate only one of said switches at any one time.

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17. The brush chipper of claim 13 including:

a forward feed switch operatively attached to said frame and to a circuit for causing the rotary feed member to rotate in a forward feed direction under certain circumstances when the forward feed switch is activated;

a stop switch operatively attached to said frame and to a circuit for shutting off the rotary feed member when said stop switch is activated and permitting said rotary feed member to rotate under other circumstances when said stop switch is not activated;

a reverse switch operatively attached to said frame and to a circuit for reversing the direction of the rotary feed member under certain circumstances when the reverse switch is activated; and

a cam operatively associated with said switches for permitting an operator to activate only one of said switches at any one time.

18. The brush chipper of claim 17 wherein said cam is operatively pivotally attached to said frame and has a raised portion on a raised portion side of the cam, said raised portion being for mutually exclusive depressing contact with each one of said switches at predetermined positions of said cam, whereby contact of the raised portion of the cam with any one of said switches causes said contacted switch to be activated.

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19. The brush chipper of claim 18 wherein said cam has a first and a second depression one side thereof opposite to said raised portion side thereof and a follower biased into contact with said one side thereof, said forward feed position of said cam corresponding to the position when said follower is disposed in said first depression and the forward feed switch is in contact with said raised portion of the cam.

20. The brush chipper of claim 19 wherein said neutral position corresponds to the position when said follower is in said second depression thereof and none of said switches are in contact with said raised portion of the cam.

21. The brush chipper of claim 20 wherein said stop position corresponds to the position when said follower is on the other side of said first depression from the second depression and said stop switch is in contact with said raised portion of the cam.

22. The brush chipper of claim 21 wherein said reverse position corresponds to the position when said follower is on the opposite side of the second depression of the cam from the first depression and said reverse switch is in contact with said raised portion of the cam.

23. The brush chipper of claim 22 wherein a linkage is operatively attached to said upper feed control member and said cam.



24. The brush chipper of claim 23 wherein said follower includes a roller for following an edge surface of said one side of the cam whereby the first depression operates as a detent to serve as indications to the operator that the feed control member is in the forward feed position.

25. The brush chipper of claim 23 wherein said follower whereby the second depression operates as a detent for receiving the roller to serve as an indication to the operator that the feed control member is in the neutral position.

26. The brush chipper of claim 25 including means requiring the operator to maintain force on the feed control member to keep the feed control member in the stop position.

27. The brush chipper of claim 25 including means requiring the operator to maintain force on the feed control member to keep the feed control member in the reverse position.

28. A brush chipper comprising:  
a frame;  
cutting members for cutting tree branches operatively attached to said frame;  
at least one rotary feed member operably mounted to said frame for rotating in one direction to pull said tree branches and deliver said branches to said cutting members for cutting the branches into smaller pieces;  
an engine operatively attached to said frame and to said cutter members for rotating said cutting members;

a feed table operably attached to said frame for supporting said branches and guiding said branches toward said rotary member, said feed table having a front end and a rear end, said front end being adjacent to said rotary member;

an upper feed control member for controlling the rotary feed member, said upper feed control bar having a stop position for stopping the rotary feed member, a forward feed position for causing forward feed of the rotary feed member by rotation in one direction, a neutral position and a reverse position for causing the rotary feed member to rotate in a direction reverse of said one direction;

a lower feed stop member operatively attached to the front end of said feed table, said lower feed stop member having a forward position, an intermediate position and a rearward position; and

a shut off mechanism operatively attached to said feed table and to said lower feed stop member for shutting off the rotation of the rotary member when said lower feed stop member moves from said rearward position to a predetermined one of said forward position or said intermediate position, whereby when said lower feed stop member moves to said predetermined position, the shut off mechanism will stop the rotary member.

29. The brush chipper of claim 28 further comprising a circuit including:

a stop switch operatively attached to said feed roller and to said upper feed control bar;

a forward feed switch operatively attached to said feed roller and to said upper feed control bar;

a reverse feed switch operatively attached to said feed roller and to said upper feed control bar;

a normal sensitivity switch operatively attached feed roller and to said lower feed stop bar for stopping the feed roller when the lower feed stop bar is in the reverse position; and

a reduced sensitivity switch operatively attached feed roller and to said lower feed stop bar for stopping the feed roller when the lower feed stop bar is in the intermediate position.

30. The brush chipper of claim 29 including means for activating said stop switch and thereby preventing said feed rollers from moving before resetting by predetermined events other than movement of said top feed control bar and lower feed stop bar.

31. The brush chipper of claim 30 wherein said stop switch activating means comprises means for activating said stop switch when a key to said circuit is turned off and then on.

32. The brush chipper of claim 29 further comprising an engine speed sensor for sensing the speed of rotation of said engine.

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33. A method of operating a brush chipper of a type comprising:
  - a frame;
  - cutting members for cutting tree branches operatively attached to said frame;
  - at least one rotary feed member operably mounted to said frame for rotating in one direction to pull said tree branches and deliver said branches to said cutting members for cutting the branches into smaller pieces;
  - an engine operatively attached to said frame and to said cutter members for rotating said cutting members;
  - a feed table operably attached to said frame for supporting said branches and guiding said branches toward said rotary member, said feed table having a front end and a rear end, said front end being adjacent to said rotary member;
  - an upper feed control member for controlling the rotary feed member, said upper feed control bar having a stop position for stopping the rotary feed member, a forward feed position for causing forward feed of the rotary feed member by rotation in one direction, a neutral position and a reverse position for causing the rotary feed member to rotate in a direction reverse of said one direction;
  - a lower feed stop member operatively attached to the front end of said feed table, said lower feed stop member having a forward position, an intermediate position and a rearward position; and
  - a shut off mechanism operatively attached to said feed table and to said lower feed stop member for shutting off the rotation of the rotary member when said lower feed stop member moves from said rearward position to a predetermined one of said forward position or said intermediate position, whereby when said lower feed stop member moves to said

predetermined position, the shut off mechanism will stop the rotary member; and

a circuit including:

a stop switch operatively attached to said feed roller and to said upper feed control bar;

a forward feed switch operatively attached to said feed roller and to said upper feed control bar;

a reverse feed switch operatively attached to said feed roller and to said upper feed control bar;

a normal sensitivity switch operatively attached feed roller and to said lower feed stop bar for stopping the feed roller when the lower feed stop bar is in the reverse position; and

a reduced sensitivity switch operatively attached feed roller and to said lower feed stop bar for stopping the feed roller when the lower feed stop bar is in the intermediate position;

said method comprising:

determining if the stop switch has been recently tripped; and

if said stop switch has not been recently tripped, resetting the circuit by moving the upper feed control bar to reverse before movement of the upper feed control bar will cause further rotation of said feed roller.

34. A method of operating a brush chipper of a type comprising:

a frame;

cutting members for cutting tree branches operatively attached to said frame;

at least one rotary feed member operably mounted to said frame for rotating in one direction to pull said tree branches and deliver said branches to said cutting members for cutting the branches into smaller pieces;

an engine operatively attached to said frame and to said cutter members for rotating said cutting members;

a feed table operably attached to said frame for supporting said branches and guiding said branches toward said rotary member, said feed table having a front end and a rear end, said front end being adjacent to said rotary member;

an upper feed control member for controlling the rotary feed member, said upper feed control bar having a stop position for stopping the rotary feed member, a forward feed position for causing forward feed of the rotary feed member by rotation in one direction, a neutral position and a reverse position for causing the rotary feed member to rotate in a direction reverse of said one direction;

a lower feed stop member operatively attached to the front end of said feed table, said lower feed stop member having a forward position, an intermediate position and a rearward position;

a shut off mechanism operatively attached to said feed table and to said lower feed stop member for shutting off the rotation of the rotary member when said lower feed stop member moves from said rearward position to a predetermined one of said forward position or said intermediate position, whereby when said lower feed stop member moves to said predetermined position, the shut off mechanism will stop the rotary member; and

a circuit including:

a forward feed switch operatively attached to said feed roller and to said upper feed control bar;

a reverse feed switch operatively attached to said feed roller and to said upper feed control bar;

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a stop switch operatively attached to said feed roller and to said upper feed control bar;

a normal sensitivity switch operatively attached to said feed roller and to said lower feed stop bar for stopping the feed roller when the lower feed stop bar is in the reverse position;

a reduced sensitivity switch operatively attached to said feed roller and to said lower feed stop bar for stopping the feed roller when the lower feed stop bar is in the intermediate position;

and

an engine speed sensor for sensing the speed of rotation of said engine;

said method comprising:

- determining if the stop switch has been recently tripped;
- if said stop switch has not been recently tripped, resetting the circuit by moving the upper feed control bar to reverse before movement of the upper feed control bar will cause further rotation of said feed roller;
- sensing the speed of rotation of said engine; and
- allowing rotation of the feed roller only after the speed of rotation of the engine is above a predetermined speed.

35. A method of controlling a brush chipper of a type having an engine, an engine speed sensor, cutters, feed rollers and a forward feed control, the method comprising:

- monitoring the engine speed;
- calculating the rate of engine deceleration;
- if the engine speed will be below a droop threshold at a next time interval and the feed rollers are currently feeding material, stop the feed rollers so that the engine can be at a higher speed before cutting again;

if the engine speed will be below the droop threshold at the next time interval and the feed rollers are moving in a forward direction to deliver brush to the cutters, continue the movement of the feed rollers;

if the engine speed will be below the droop threshold at the next time interval and the engine speed is not above a recovery point, do not start the feed rollers in a forward direction so the cutting does not take place while the engine speed is too low; and

if the engine speed is above a recovery point, start the feed rollers in a forward direction.

36. A method of controlling a brush chipper of a type having an engine, an engine speed sensor, cutters, feed rollers and a forward feed control, the method comprising:

stopping the feed rollers because the engine speed has dropped below a predetermined speed;

reversing the feed rollers for a predetermined period of time;

if the engine speed continues to drop, reverse the feed rollers for a second predetermined period of time; and

if the engine speed is above a recovery point, start the feed rollers in a forward direction.

37. A method of controlling a brush chipper of a type having an engine, an engine speed sensor, cutters, feed rollers and a forward feed control, the method comprising:

stopping the feed rollers because the engine speed has dropped below a predetermined speed;



reversing the feed rollers for a predetermined period of time; and  
operating the feed rollers in a forward direction to deliver brush to the cutters.

38. A method of controlling a brush chipper of a type having an engine, cutters, feed rollers, a hydraulic control for rotating said feed rollers, said hydraulic control having a relief valve for permitting oil to be re-circulated due to high oil pressure when the feed rollers quit rotating due to being jammed and a hydraulic switch in the relief valve circuit to sense a predetermined high pressure, the method comprising:

operating the feed rollers and cutters to cut brush;

if the hydraulic switch senses said predetermined high pressure, momentarily  
reversing the feed rollers for a predetermined period of time; and

resuming operation of the feed rollers to cut brush if the oil pressure is below said  
predetermined pressure.

39. A method of controlling a brush chipper of a type having an engine, cutters, feed rollers, and means for sensing the speed of said feed rollers, the method comprising:

operating the feed rollers and cutters to cut brush;

if said feed rollers are slowed by a predetermined amount or stopped, momentarily  
reversing the feed rollers for a predetermined period of time; and

resuming operation of the feed rollers to cut brush.

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40. A method of controlling a brush chipper of a type having an engine, cutters, feed rollers, a forward feed control and a resistor for identification purposes and a controller adapted to control different brush chippers in a different manner, the method comprising:

using said controller at startup to identify the resistor and match the resistor with a predetermined operating program; and

using said predetermined operating program to control said brush chipper.

41. A method of controlling a brush chipper of a type having an engine, cutters, feed rollers, a forward feed control and a controller adapted to identify characteristics of different brush chippers and to control different brush chippers in different ways, the method comprising:

using said controller at startup to match a brush chipper to which the controller is attached with a predetermined operating program; and

using said predetermined operating program to control said brush chipper.

42. A brush chipper comprising:

a frame;

an engine attached to said frame;

cutters operably attached to the engine;

feed rollers operatively attached to the engine;

an electrical component useful for identification purposes and a controller adapted to control different brush chippers in a different manner;

means associated with said controller at startup to identify the electrical component and match the electrical component with a predetermined operating program; and

means associated with said controller for using said predetermined operating program to control said brush chipper.

43. A method of controlling a brush chipper of a type having an engine, cutters, feed rollers, a forward feed control and means for sensing how long the brush chipper has not been used for chipping, said method comprising:

if the brush chipper has remained unused for a predetermined period of time, reduce the engine speed to idle while allowing the feed rollers to rotate;

when said feed rollers move apart, stop the feed rollers until said engine returns to a predetermined speed; and

after said engine returns to said predetermined speed, start the feed rollers to allow brush to be pulled into the cutters by the feed rollers.

44. A method of controlling a brush chipper of a type having an engine, cutters, feed rollers, a forward feed control and means for sensing how long the brush chipper has not been used for chipping, said method comprising:

if the brush chipper has remained unused for a predetermined period of time, reduce the engine speed to idle while allowing the feed rollers to rotate;

if the engine speed slows below idle speed due to brush being cut again, stop the feed rollers until said engine returns to a predetermined speed; and

after said engine returns to said predetermined speed, start the feed rollers to allow brush to be pulled into the cutters by the feed rollers.